Maharashtra State Board of Vocational Examination, Mumbai 400 051

1	**Name of Course**	**Diploma Course in Auto Engineering Technician**
2	**Course code**	**306402**
3	**Max no. of Students**	25
4	**Duration**	2 year
5	**Course Type**	Full Time
6	**No. of Days per week**	6 days
7	**No. of hours per day**	7 Hrs
8	**Space require**	Theory Class Room – 200 sqft Three Practical Lab – 500 sqft each
9	**Entry qualification**	S.S.C. Pass
10	**Objective of syllabus**	1. Understand the constructional features and functions of Internal combustion engine. 2. Various hand tools, gauges, instruments and special equipments. 3. Understand constructional features and functions of fuel injection pump and feed pump. 4. Understand construction and working of Lathe, Grinder, Drill machine. 5. Learn the properties and use of lubricating oil and maintenance schedule. 6. Understand and read Engineering drawing. 7. Understand construction and working of two stroke and four stroke engine. 8. Understand the working of typical fuel system. 9. Learn how to prepare estimate for repairs. 10. Learn how to maintain the accounts. 11. Get acquainted with traffic signs, rules and pollution control rules.
11	**Employment opportunities**	The trainee will either to be able to take up jobs with agencies which develop, maintain, repairs vehicles & maintenance engine . Work as or with working experience will be in a position to start his own independent business.
12	**Teachers Qualification**	1) For Vocational subject - B.E.Mech./Auto 2) For Non Vocational Subject - Master Degree in Concern subject

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Teaching Scheme –

Sr.	Subject	Subject Code	Clock Hours / Week		Total
			Theory	Practical	
1	**English (Communication Skill)**	90000001	2 Hrs	1 Hrs	3 Hrs
2	**Elective – I**	--	2 Hrs	1 Hrs	3 Hrs
3	**Elective – II**	--	2 Hrs	1 Hrs	3 Hrs
4	**Mech. Techn. Material Science**	30640001	3 Hrs	8 Hrs	11 Hrs
5	**Theory of vehicle**	30640002	3 Hrs	8 Hrs	11 Hrs
6	**Garage management**	30640004	3 Hrs	8 Hrs	11 Hrs
Total					**42 Hrs**

14	**Internship**	Two Month Summer Internship from 1st May to 30th June is Compulsory.

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Examination Scheme – Final Examination will be based on syllabus of both years.

Paper	Subject	Subject Code	Theory			Practical			Total	
			Duration	Max	Min	Duration	Max	Min	Max	Min
1	**English (Communication Skill)**	90000001	3 Hrs	**70**	**25**	3 Hrs	**30**	**15**	**100**	**40**
2	**Elective – I**	--	3 Hrs	**70**	**25**	3 Hrs	**30**	**15**	**100**	**40**
3	**Elective – II**	--	3 Hrs	**70**	**25**	3 Hrs	**30**	**15**	**100**	**40**
4	**Mech. Techn. Material Science**	30640001	3 Hrs	**100**	**35**	3 Hrs	**100**	**50**	**200**	**85**
5	**Theory of Vehicle**	30640002	3 Hrs	**100**	**35**	3 Hrs	**100**	**50**	**200**	**85**
6	**Garage management**	30640004	3 Hrs	**100**	**35**	3 Hrs	**100**	**50**	**200**	**85**
								Total	**900**	**375**

16	**Teachers** – Three Teachers per batch for vocational component. For English, Elective-I & II guest faculty on clock hour basis.	
17	**a) For Elective I – Student can choose any one subject** **Code** **Subject Name** 90000011 Applied Mathematics 90000012 Business Economics 90000013 Physical Biology (Botany & Zoology) 90000014 Entrepreneurship 90000015 Psychology	**b) For Elective II – Student can choose any one subject** **Code** **Subject Name** 90000021 Applied Sciences (Physics & Chemistry) 90000022 Computer Application 90000023 Business Mathematics

Subject Code : 30640001

Subject Name - Mechanical Technology and Material Science – 1st Year

Theory	Practical
1] **Fundamental of material** Introduction of metals and non metals Structure of metal Formation of grain Imperfection in crystals Deformation in metal and change in properties Fracture Equilibrium diagram Iron, carbon equilibrium diagram Time temperature transformation diagrams	1. Take the tensile test of M.S. specimen & Draw stress strain diagram, yield pts.
2 **Ferrous metals and alloys** Pig iron and cast iron Effect of chemical elements on iron Classification of steel and its application Alloy steel and special alloy steel 3 **Non Ferrous metals and alloys** Introduction to non ferrous alloys Aluminum and its alloys Copper and its alloys Lead and its alloys Nickel and its alloys Alloys for high temperature service Metal for nuclear energy 4 **Crystal Structures** Fundamental concept Unit Cells Metallic crystal structures FCC Structure BCC Structure HCP Structure Weld ability 5 **Properties of Metal** **Mechanical properties of Metal** Elasticity, ductility, malleability, brittleness, Toughness, Stress strain behavior, Elastic limit, hooks Law, UTS, poisons ratio, factor of safety, hardness and hardness tests shear strength, resistance.	2. Study the mechanical properties like Elasticity, ductility, malleability, Brittleness, toughness of Different materials – M.S., C.S. Bronze, Copper, Aluminum Study the Hardness test Brinnel Hardness test Rockwell hardness test

Electrical properties of Metal Electrical conductivity, resistivity, electrical Characteristic of commercial alloys **Thermal properties of metal** Heat capacity, thermal expansion, thermal Conductivity, thermal stress	
6 **Magnetic Properties of metal** Basic concepts, diamagnetism and Para magnetism, ferromagnetism, influence of temperature on magnetic behavior, domain and hystersis, soft and hard magnetic material. 7 **Heat Treatment of material** Normalizing Hardening Quenching and tempering Annealing Stress Relieving Case carburizing and case hardening. Toughening Weld ability of Metal definition and concept Effect of alloying elements on weld ability Purpose and types of weld ability tests	3. Study the Electrical Properties of some conductors (conductivity, Resistively) Aluminum, Copper, Brass, Tungsten
8 **Cracking phenomena in steel** Cold crack due to hydrogen Hydrogen cracking Measurement and control of hydrogen in the deposited weld metal Cracking mechanism in the weld metal and HAZ Weld decay Lamellar tearing Hot cracking Reheat cracking	4. Study the effect on materials with heat treatment Normalizing, Hardening, Quenching & Tempering Anne ling, Stress Reliving, Case Hardening, Toughing For Different Material's M.S., C.S.,Nickel, Capper

Subject Name - Mechanical Technology and Material Science – 2nd Year

Theory	Practical
1. Bench work and fitting Introduction- Vices – Hammers- Chisels- Chipping- Files- Filling- Scrapper- Scraping-Grinding and Polishing- Hacksaw sawing- Marking tools – Surface plate- Scriber – Punch- V block- Angle plate- Try square –Marking out –Drill- Drilling- Reamer- Reaming- Taps- Tap drill size- Tapping – Dies and stock- Dieing. **2. Sheet Metal Work** Introduction – Metal used in sheet metal work-Sheet metal hand tools- Sheet metal operation-Sheet metal joint- Hems and Sems – Sheet metal allowance- Sheet Metal working machine-Laying out a pattern **3. Plumbing, Threading, Fasteners & joints** Plumbing- Specifications of pipes- Material used for pipes-Pipe fitting & Joints-Taps & valves –Plumber tools – Threaded fasteners- screw threads and their uses- Indian standard threads-Cap screw and machine screw-Set screw- Methods of producing screw threads- Bolts- Studs- Forms of nuts- Riveting joints. **4. Smithy and Forging** Maintenance and application of smith health-Anvil- Swage block-Tongs- Hammer-Flatters-Measuring tools e.g.-Try square- Steel rules-Calipers-Operations e.g. up setting- drawing down- bending setting- forge welding. **5. Welding Technology** Welding Welding introduction to different welding processes, like gas Welding, ARC welding TIG, MIG, submerged arc welding, spot Welding, electrodes etc. Brazing methods & application, Knowledge of welding skills.	**Fitting** 1. Filing Flat surfaces: Checking flatness and square ness using a try square – Types of filing – Cleaning files. 2. Chipping: Hints on chipping 3. Hack sawing: Selection of blades for different metal sections - Fix hack sawing the material for the job blades maintaining. Correct tension and direction – Hack sawing. Filing 'V groove and complex profile by file & check with profile gauge. 4. Filing radius –check with radius gauge 5. Check profile with profile gauges. 6. Drill plate, Drilling, counter sinking, counter boring. Operations on job 7. Drilling and Tapping: Internal threading of holes by using hand taps – determine the tap drill size, drilling, counter- sinking and tapping – precautions with tapping a blind hole. 8. External thread cutting using die.

6. Metal Turning (Lathe) 6.1 Function of lathe, Types of lathe, the size of lathe, Descriptions & function of lathe parts, 6.2 Lathe accessories and attachments. 6.3 Operation on Lathe 6.4 Cutting Tools, Classification , Influence of tool angles. 6.5 Types of tools, cutting speed, Feed, Depth of cut, 6.6 Machining time. Cutting tool signature.	
7. DRILLING Introduction Types of drilling machine, Portable drilling machine, Sensitive drilling machine. Upright drilling machine, Radial Drilling Machine; Gang drilling machine, Multiple spindle drilling machine Automatic drilling machine, Deep hole drilling machine; The size of a drilling machine, Upright drilling machine parts. Radial drilling machine parts, Work holding devices, Tool holding devices, Drilling machine operation, Drilling machine tools. Twist drill nomenclature. Drill size Designation of drill material Reamer, reamer nomenclatures. Counter bore, Countersinks and spot face, Taps. Tap nomenclatures. Cutting speed Feed, Depth of cut, Machining time in drilling	**Basic Workshop Practice** 1. Step turning and Radius forming: Free hand form turning – by using form tool. 2. Drilling and Boring-Use of inside caliper and outside Micrometer for bore measurement. 3. Drilling and reaming: by hand-Method of checking the bore With a plug gauge. 4. Drilling and step Boring: Boring blind hole with a boring tool.
8. SHAPER Introduction. Types of shapers. Principal parts. Shaper size; Shaper mechanism; Work holding devices. Shaper operations. Shaper tools; Cutting speed, feed and depth of cut; Machining time. **9. SLOTTING** Introduction. Types of slotting machine; Slotter size; Slotting machine parts; Work holding devices; Slotter operation; Slotter tools; Cutting speed, feed and depth of cut.	5. Drilling, Boring and Recessing: Internal recessing to a size broader than the width tool – Form a recess. 6. Shaping blind & open keyways on shaping machine 7. Shaping irregular surfaces.(Concave / Convex)

10. Powder Metallurgy Introduction- Process Description- Manufacture of metal powder- Blending of powders- competing profiteering- Sintering-Secondary operation –ISO Static pressing –Product of powder metallurgy- Advantages of process –Disadvantages and limitation-Design considerations Introduction to CNC	8. Slotting internal grooves on slotting machine 9. Welding Practical-fusion run with/without filler rod on MS Sheet – squire butt joint on MS sheet LAP,T& Edge joint on M.S. Sheet

List of Books –

1. M. N. Uppal A Text - book of ngineering Chemistry
2. V. P. Mehta A Text - book of polytechnic Chemistry
3. Banswal, Mahajan and Mehta A Text - book of,Applied Chemistry
4. Hazra Choudhary Elements,of workshop technology
5. S.K.Hajra Choudhary Elements of workshop technology Vol-I First 1964 Media promoters & Publisher pvt. Ltd.
6. Mahajan Mechanical Technology Third 1989 Vrinda publication

List of Equipments / Machinery :

Sr. No.	Name of the Equipment/ Machinery	Nos.
1	TRAINEES TOOL KIT	5
2	Try Square 10 cm Blade	5
3	Calipers outside 15 cm spring	5
4	Caliper inside 15 cm spring	5
5	Dividers 15 cm Spring	5
6	Calipers 15 cm Hermaphrodite	5
7	Scriber 15 cm	5
8	Punch center 10 cm	5
9	Screw driver 15 cm	5
10	Chisel cold 20 cm	5
11	Trammel 30 cm	5
12	Hammer ball peen 0.5 kg with handle	5
13	Hammer Mallet	5
14	Hammer Plastic	5
15	Hammer ball peen 0.5 kg with handle	5
16	File flat 25 cm second cut	5
17	File flat 25 cm second cut	5
18	Hacksaw frame adjustable 20-30 cm	5
19	Dot slot punch	5
20	Steel rule 15 cm English and metric	5
21	Steel rule 30 cm English and metric	5
22	Try square 20 cm Blade	5
23	Steel tool box	5
24	Scriber	5
25	Lock and keys	5
26	Combination plier	5
27	Jenny calipers	5
28	Aluminum tray 15 cm X 10 cm	5
29	Fellow polish cloth standard size	5
	Shop Outfit & Measuring Instruments	
30	Straight edge 45 cm X 45 cm	1
31	Marking table 90X90 cm	1
32	Surface plate 45 cm X 45 cm	1
33	Vee Block pair 7 cm and 15 cm with clamps	1
34	Angle plate 10 X 20cm	1
35	Number Punch 3 mm set	2
36	letter Punch 3 mm set	2
37	Round punch 3 mm X 4 mm set of 2	2
38	File flat 20 cm bastard	2
39	Oil Stone 15 X 5 cm X 2.5 cm	
40	Spanner adjustable 10 cm	1
41	Chisel cold 20 cm cross cut	2

42	Chisel 10 cm flat	2
43	Drill twist 1.5 mm to 15mm (various sizes) by 0.5	2
44	Files assorted sizes and type including safe edge	10
45	Micrometer inside 50-150 mm with screen	2
46	Bench Vice 12 cm jaw	5
47	Work Bench 240 X 120 60 mm with screen	3
48	Drill point angle gauge	1
49	Vernier Calipers 20 cm	2
50	Vernier height gauge 30 cm	1
51	Huntington and diamond dresser	1
52	Taps and dies complete set (metric)	2 set
53	Hacksaw frame	5
54	Fire buckets with stand	1
55	Thread pitch gauge metric, BSX, BSF, MC, MF & SAE	1 each
56	D.E. spanner ser of 12 metric 6 mm to 32 mm	1 set
57	Ring spanner set at 12 metric 6 mm to 32	1 set
58	Stud extractor set of 3	1 set
59	Universal puller for removing pulleys, bearings	1 set
60	Unserviceable engine/gear box rear axle	1
61	Stud remover with socket handle	1
62	Combination pliers 15 cm	5
63	Depth guage (inch and metric	1
64	Screw pinch gauge (inch and metric)	1 set
65	Feeler gauge 20 blades (inch and metric)	1
66	Aluminum tray 45 X 30 mm	5
67	Oil can 0.5 liter capacity	1
68	Surface gauge	1
69	Cylinder bore gauge (mercer)	1
70	Telescopic gauge	1
71	Steel measuring tape 10 meter in a case	2
72	Sets of Morse socket MT 0-1,1-2,and 2-3	1 set
73	Blow lamp	1
74	Torque wrenches 5-35 Nm,12-68 Nm&50-225 Nm.	1 each
75	Outside micrometer English 0-1,1-2,2-3,3-4,4-5,And 5-6 inches	1 each
76	Micrometer outside 1 to 25 mm,25mmto 50mm ,50 to75 mm,75 to100mm,100 to 125mm,125 to 150mm.	1
77	Surface gauge with dial test indicator plunger type i.e. 0.01 mm	1
78	Printed wall chart framed for display showing measuring instruments.	10
79	Inside micrometer English 2” to 6” with extension road	1
80	Vernier bevel protractor (metric and inch)	1
81	Vernier calipers (inch and metric) 6”x12”	1
82	Vernier micrometers(inch and metric)	1
83	Vernier height gauge 150 mm height (inch and metric)	1
84	Dial micrometer (inch and metric)	1
85	Small bore gauge (standard)	1
86	Dial test indicator to read (inch an metric)0.02mm	1

	General Installatoin /Machineries	
87	Radial Drilling Machine 25mm capacity	1
88	Power Hacksaw	1
89	Rotary Cut off Machine	1
90	Shaping machine	1
91	Hydraulic Press 2 ton capacity	1
92	Surface plate (small)	1
93	Surface plate (big)	1
94	Standard Arc Welding machine	1
95	Horizontal milling machine	1
96	Bench Drilling machine 6-12mm cap Motorized with chuck and key	1
97	Grinding machine (general purpose)D.E. pedestal with 300mm dia wheels rough and smooth	1
98	Hydraulic Trainer with Power pack	1
99	Pneumatic Trainer	1
	Workshop Furniture	
100	Suitable Work Tables with vices As required	1
101	Stools 25 Nos	25
102	Tool Cabinet 2 nos	2
103	Trainees locker 2 nos	2
104	Fire fighting equipment , first aid box etc As required	1
105	Book shelf (glass panel) 1 nos	1
106	Storage Rack As required	2
107	Storage shelf As required	2

Subject Code : 30640002
Subject Name : Theory of Vehicle – 1st Year

1. Introduction
- General Introduction o the Vehicle
- Types of Vehicles
- Classification o Engine
- Difference between I. C. Engine and E. C. Engine
- Classification of engines
- Leading Manufacturers of Motor Vehicles

2. Working of I. C. Engine
- Introduction
- Otto Cycle
- Diesel Cycle
- Difference between S.I. And C. I. Engines
- Two Stroke Engine
- Merits and Demerits of Two Stroke and Four Stroke Cycle Engines
- Difference between 2- Stroke and 4- Stroke Cycle Engines

3. Construction of I.C. Engine
- Introduction
- Cylinder Block
- Cylinder Head
- Crank Case
- Oil Pan or Sump
- Piston
- Piston Rings
- Piston Pins
- Connecting Rod
- Crankshaft
- Flywheel
- Vibration Damper
- Camshaft
- Valve and Valve Mechanisms
- Gaskets
- Main Bearings
- Manifolds

4. Merits and Demerits of Auto Engine
- Construction and Working of Multi cylinder Engine
- Classification of Multi cylinder Engines
- Merits and Demerits of Multi cylinder and Single Cylinder Engines
- Merits and Demerits of Diesel Engine over Petrol Engine
- Comparison between 4-Stoke Single and Multi Cylinder Engines

5. Valves and Valve Actuating Mechanism

- Introduction
- Requirements of Valve
- Types of Valve
- Valve Actuating Mechanisms
- Valve Tappet Clearance
- Tappet Clearance Adjustment
- Camshaft
- Camshaft Drive Mechanisms
- Valve Timing
- Valve Timing Diagram

6. Automotive Ignition System

- Introduction
- Requirements of an Ignition System
- Types of an Ignition System
- Battery Ignition System
- Magneto Ignition System
- Electronic Ignition System
- Description of Various Components Used In Ignition System
- Firing Order
- Comparison of Battery Ignition and Magneto Ignition

7. Automotive Cooling System

- Introduction
- Function and Working of Cooling System
- Types of Cooling System
- Antifreeze Solutions
- Coolant
- Temperature Indicators
- Indicator Light

8. Automotive Lubrication Systems

- Introduction
- Objects of Lubrication
- Properties of Good Lubricant
- Lubricating Systems
- Functions of Lubricating Oil
- Types of Lubricants
- Lubricating Parts
- Chassis Lubrication Points
- **Steering Gear Box and Rear Axle Lubrication**
- Wheel Hub
- **General Chassis Lubrication**
- Viscosity Rating
- Importance of Multi Grade Oil & Grease
- Importance of Correct Quality and Replacement Frequency of Oil
- The Lubrication Chart
- The Different Systems of Engine Lubrication
- Pet roil System: (Gravity Feed System)
- Splash System
- Dry Sump System
- Pressure System
- Parts of Lubricating System
- Oil Sump
- Oil Pump
- Oil Strainer
- Oil Filter
- Oil Cooler
- Oil Pressure Gauge
- Pressure Relief Valve
- Oil Level Indicator
- Use of Oil Seals in Engine

Subject Name : Theory of Vehicle – 2nd Year

1. Clutch

- Introduction
- Purpose of clutch
- Function of Clutch
- Types of Clutch
- Manually Operated Clutch
- Automatic Clutch
- Diaphragm type clutch
- Coils spring clutch
- Multiplate clutch
- Centrifugal type of clutch
- Hydraulic clutch
- Hydraulic Operated clutch
- Clutch linkage inspection & servicing
- Clutch adjustment
- Qualities of good clutch

2. Transmission

- Introduction
- Types of gears
- Purpose of Gear box
- Principle of gear
- Gear shifting
- Types of gear box
- Overdrive
- Planetary gear box

3. Drive line

- Introduction
- Function of propeller shop
- Types of drive
- Universal joint
- Slip joint

4. Rear Axle & Differential

- Introduction
- Functions of rear axle
- Types of rear axle
- Type of axle drives
- Axle casing
- Differential
- Differential assembly
- Working of differential
- Type of differential
- Crown wheel & pinion adjustment
- Backlash adjustment

5. Automotive Springs & Suspension

- Introduction
- Objects of suspension
- Springs
- Function of suspensions spring
- Types of suspension spring
- Helper springs
- Coil springs
- Torsion bar
- Rubber springs
- Stabilizers of antiroll device
- Properties of good suspension system
- Type of suspensions
- Rigid axle suspension system
- Independent suspensions
- Advantages of Independent front suspension system
- Type of front wheel independent suspension
- Rear wheel/Rear axle independent suspension
- Air suspension
- Hydrostatic suspension
- Leaf spring front suspension
- Static suspension
- Advantages of static suspension
- Shock absorbers
- Purpose of shock absorbers
- Type of shock absorbers
- Telescopic type shock absorber
- Gas filled shock absorber
-

6. Steering system

- Qualities of steering system
- Main parts of steering system
- Working of steering system
- Brief description of steering parts
- Steering gear ratio
- Steering geometry
- Caster
- Camber
- King pin inclination
- Toe-in
- Toe-out
- Ackerman steering gear
- Steering lock
- Power steering
- Steering linkage

7. Automotive Brake

- Introduction
- Function of brake
- Classification of brakes
- External Contracting Brakes
- Internal Expanding Brakes
- Brake shoes or liner
- Types of Brake lining
- Mechanical Brakes
- Hydraulic Brakes
- Master cylinder
- Wheel cylinder
- Advantages of Hydraulic Brakes
- Disadvantages of Hydraulic Brakes
- Brake Fluid
- Characteristics of Brake Fluid
- Disc Brakes
- Advantages of Disc Brakes
- Disadvantages of Disc Brakes
- Power Brake
- Air Brakes
- Vacuum Brakes
- Vacuum Servo brakes
- Vacuum & Hydraulic Servo Brakes
- Brake bleeding
- Precautions taken at the time of bleeding
- Brake pedal adjustment
- Brake adjustment

8. Automotive Chassis

- Frame & Chassis
- Types of chassis
- Frame
- Frame construction
- Truck frames
- Bumpers
- Types of frame
- Frame section
- Channel section
- Box sections of welded or butt type
- H-Section or I-Section
- Tubular section
- Cross members
- Material for frame
- Sub frame
- Chassis frame defects & their remedies

- Frame repair
- Loose rivets
- Cracks
- Chassis alignment
- Frameless Construction
- Body
- Qualities of good body
- Body construction

9. Wheels & Tyres

- Types of tyres
- Air pressure in tyres
- Tyre construction
- Mountings of tyres
- Tyre inspection
- Tyre removal
- Rotation of Tyre
- Defects in tyres
- Types of Wheels
- Repairs of Tyres & Tubes
- Vulcanizing
- Tyre retreading

10. Automtive Fuel Systems Of Petrol Engine

- Introduction.
- Function of fuel system of petrol engine
- Purpose Of fuel system
- Fuel Supply Systems.
- Components of Fuel Supply Systems.
- Simple Carburetor.
- Air cleaner
- Super Charging.
- Turbochargers:-

11. Diesel Engine Fuel Supply Systems

- Introduction.
- Requirements of Fuel Injection System –
- Methods of Fuel Injection.
- Components of Fuel Injection System.
- Advantages of high speed diesel (H.S.D.) Fuel system.
- Disadvantages of H.S.D. Fuel System.
- Direct Injection Engines.

12. The Electrical System

- Introduction.
- Purpose .
- Types of Battery:
- Lead – Acid Battery.
- Working .
- Checking the state of charge:-
- Charging Procedure .
- Battery Testing .
- Battery Maintenance.
- Dry Charged Batteries.
- Cranking Motor.
- Function of Cranking Motor.
- Motor Principle .
- Construction of Motor.
- Drive Arrangement .
- Types of Drive Arrangements :-
- Starting Motor Control.

13. The Charging Circuit

- Introduction
- Function of Generator :-
- Principle Of D.C. Generator
- Construction Of Generator.
- Working Of D.C. Generator.
- Alternator :-
- Principle :-
- Construction Of An Alternator
- Working Of Alternator:-
- Generator Regulation:-
- D.C. Generator Regulation:-
- Regulators :-
- A.C. Generator Regulation:-
- Cut-out Relay :-
- Ammeter:-
- Rectifier:-

14. Advanced Features in Morden Car

- Introduction
- Power windows:
- Windscreen wiper:
- Car heating system:
- Engine analysis:

Subject Code : 30640004

Subject Name : Garage Management

Automotive engine -

- Engine will not turn over,
- Engine turns over's but does not start
- Engine run but missed
- Engine jacks power & engine overheated,
- Engine is noisy ,
- engine has poor idle slow warm up ,
- smoky exhaust ,
- stalling of engine ,
- engine back firing

Fuel supply -

- Excessive fuel consumption,
- Poor acceleration,
- Lack of power
- Engine back firing
- smoky exhaust
- stalling of engine

Engine Lubrication -

- Lubrication system,
- Excessive oil consumption,
- Low oil pressure
- Excessive oil pressure
- Cooling System -
- Engine over heat & engine warm up slowly

Cooling system

- Engine over heat
- Engine warm up slowly
- Cooling system leakage

Electrical System -

- Cranking motors drive units

Generator

- Generates ,
- principle & sketch

Chassis –

- Clutch slip wile engaging
- Clutch grabs or chatters
- Clutch spring drags & pedal pulsation

Transmission -

- Transmission noisy ,
- Hard shifting of gears
- Failure of gears to stay in mesh

Spring & shock absorber -

- Spring noise ,
- hard or rough ride ,
- sagging of spring
- Broken spring ,
- steering difficulties

Differential –

- Noise in differential ,
- Knocking in differential unit ,
- Growling while roundness a curve

Steering & front suspension system –

- Hard steering,
- car wonders
- Car pulls to one side front wheel shimmy,
- Wheel tramp erratic steering when breaks are applied
- Excessive play in steering mechanism system Improper to tyre to floor

Brakes –

- Brake pedal goes floor,
- brake drags,
- spongy brakes,
- noisy brakes

Human relation & philosophy

- Factors affecting on human relation
- Human needs
- Group working

Motivation & moral

- Human affecting on motivation & moral

Factors governing on job satisfaction

- Work based factors,
- Employer based factors, and
- employee based factors

Leader ship -

- Types,
- Auto cratic,
- Democratic,
- free rain

Types of Organization -

- Line organization,
- Functional organization,
- Line & staff organization

Maintenance of shop safety -

- Safety ensured by building aspect,
- Safety ensured by machinery & equipment
- Safety ensured based on human attitude

Book keeping -

- Register to be maintained,
- Method of accounting transaction,
- Profit & loss accounts
- Basic Inventory control & store keeping -
- Concept of maximum stock safety stock

Elements of Costing

- Direct expenses
- Indirect expenses
- Expenses on employee
- Expenses on raw material

Shop act

- Workers
- Working hours
- Holiday
- Insurances

Salesmanship

- Importance of salesmanship
- Properties of salesmanship
- Advertisement
- Publicity

Motor vehicle rules –

- Light duty vehicle ,
- Goods carriage,
- heavy vehicle ,
- heavy passenger vehicle ,
- public carriage ,
- stage carriage ,
- private service vehicle ,
- Invalid carriage ,
- gross vehicle weight
- Registration or passing of vehicle ,
- Vehicle Insurance & types ,
- Regional traffic rules
- Road signs
- Mandatory
- Cautionary signs
- Informatory

Rules & Regulation –

- Number plate
- Space for lights & indicators
- Space required
- Safety
- Traffic signs
- Driver's signals
- Different prescribed Forms
- Offences & penalties

Environment Pollution
Insurance
Road Transport
Free hand sketches of Auto Parts
Screw Threads
Fasteners
Pictorial Drawing
Practical on above topics

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